Pyxicephalus khasianus Anderson, 1871 and *Rana laticeps* Boulenger, 1882 (Dicroglossidae, Anura, Amphibia) are synonyms

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ABSTRACT

The study of publications and of museum specimens allows unequivocal identification of the type specimens of *Pyxicephalus khasianus* Anderson, 1871. These specimens were collected by Thomas Jerdon at the same time as the type specimens of *Rana laticeps* Boulenger, 1882 and belong to the same biological species. We describe and figure the lectotypes of *Pyxicephalus khasianus* and of *Rana laticeps* and give measurements of the other specimens seen by the authors of the original descriptions of both taxa. Thus, both names having been regularly used in literature, the valid name of this species is *Limnonectes khasianus* (Anderson, 1871), and *Rana laticeps* Boulenger, 1882 is its junior subjective synonym.

KEY WORDS
Amphibia,
Anura,
Dicroglossidae,
nomenclature,
synonymy,
Pyxicephalus khasianus,
Rana laticeps.

RÉSUMÉ

Pyxicephalus khasianus *Anderson, 1871 et* Rana laticeps *Boulenger, 1882 (Dicroglossidae, Anura, Amphibia) sont synonymes.*
L'étude des publications et des spécimens de collections scientifiques permet

d'identifier les spécimens types de *Pyxicephalus khasianus* Anderson, 1871. Ces spécimens ont été collectés par Thomas Jerdon en même temps que les spécimens types de *Rana laticeps* et appartiennent à la même espèce biologique. Nous décrivons et figurons les lectotypes de *Pyxicephalus khasianus* et de *Rana laticeps* et donnons les mesures des autres spécimens étudiés par les auteurs des descriptions originales des deux taxons. En conclusion, comme les deux noms ont été régulièrement cités, le nom valide de cette espèce est *Limnonectes khasianus* (Anderson, 1871), et *Rana laticeps* Boulenger, 1882 est son synonyme subjectif plus récent.

MOTS CLÉS
Amphibiens,
Anoures,
Dicroglossidae,
nomenclature,
synonymie,
Pyxicephalus khasianus,
Rana laticeps.

INTRODUCTION

The Khasi Hills in the Indian state of Meghalaya are a mountain range with interesting biogeographical relationships between Eastern Himalaya, Brahmaputra valley, Transhimalayan mountains and Malayan peninsula (Olson & Dinerstein 2002; Pawar *et al.* 2007). Its amphibian fauna has been studied since the middle of the 19th century but only recently new collections have been made which provide more information on the identity and diversity of the species present in the region (Mathew & Sen 2007; Das *et al.* 2010; Mahony *et al.* 2011; Purkayastha & Matsui 2012).

Among these, there is a species of the *Limnonectes kuhlii* (Tschudi, 1838) species group. These frogs of the genus *Limnonectes* Fitzinger, 1843 show a particular size dimorphism in males by having very much enlarged heads but do not bear any particular bulb like structures on the head (Dubois 1987). The anterior lower jaws bear teeth like odontoids in males. Several new species have been described and delineated recently from Thailand and Laos (McLeod 2008, 2010; Matsui *et al.* 2010). A single species is currently known from North-East India. The nomenclatural status of the nomina (scientific names) applied to this species is rather complex. First it was mentioned by Jerdon (1870) as a new species of *Pyxicephalus*, then it was described by Anderson (1871) as *Pyxicephalus khasianus* Anderson, 1871 and finally a second time as *Rana laticeps* by Boulenger (1882). Boulenger (1920) wrote the name of Anderson as "*Pyxicephalus khasiensis*", a spelling different from the original one of Anderson (1871) and thus created a subsequent incorrect spelling. Since the original descriptions, these nomina have been mentioned by various authors. These publications allowed us to link the specimens to the nomina and the nomina to their type specimens, thus allowing to establish the status of these nomina.

MATERIAL AND METHODS

SPECIMENS STUDIED

India, Meghalaya, Khasi Hills: BMNH 1872.1.17.295.9A, B, syntypes of *Rana laticeps* Boulenger, 1882 and ZSI 9639–9641, syntypes of *Pyxicephalus khasianus* Anderson, 1871, coll. by T. C. Jerdon in 1870.

ABBREVIATIONS

Institutions

BMNH	Natural History Museum, London;
ZSI	Zoological Survey of India, Kolkata.

Measurements

EL	eye length;
EN	distance from front of eye to nostril;
FFTF	distance from maximum incurvation of web between fourth and fifth toe to tip of fourth toe;
FL	femur length (from vent to knee);
FLL	forelimb length (from elbow to base of outer tubercle);
FOL	foot length (from base of inner metatarsal tubercle to tip of toe);
FTL	fourth toe length (from base of first subarticular tubercle);
HAL	hand length (from base of outer palmar tubercle to tip of toe);

HL	head length (from back of mandible to tip of snout);
HW	head width;
IBE	distance between back of eyes;
IFE	distance between front of eyes;
IMT	length of inner metatarsal tubercle;
IN	internarial space;
ITL	inner toe length;
IUE	minimum distance between upper eyelids;
MBE	distance from back of mandible to back of eye;
MFE	distance from back of mandible to front of eye;
MN	distance from back of mandible to nostril;
MTFF	distance from distal edge of metatarsal tubercle to maximum incurvation of web between fourth and fifth toe;
MTTF	distance from distal edge of metatarsal tubercle to maximum incurvation of web between third and fourth toe;
SL	distance from front of eye to tip of snout;
SN	distance from nostril to tip of snout;
SVL	snout-vent length;
TFL	third finger length (from base of first subarticular tubercle);
TFTF	distance from maximum incurvation of web between third and fourth toe to tip of fourth toe;
TL	tibia length;
TYD	greatest tympanum diameter;
TYE	distance from tympanum to back of eye;
UEW	maximum width of inter upper eyelid;
WFF	webbing between fourth and fifth toe (from base of first subarticular tubercle);
WI	webbing between third and fourth toe when folded along fourth toe (from base of first subarticular tubercle);
WII	webbing between fourth and fifth toe when folded along fourth toe (from base of first subarticular tubercle);
WTF	webbing between third and fourth toe (from base of first subarticular tubercle).

History and identity of the nomina *Pyxicephalus khasianus* and *Rana laticeps* and of the aponym *Pyxicephalus khasiensis*

The first available nomen *Pyxicephalus khasianus* was given by Anderson (1871) in a paper that provided a list of specimens accessed in the Indian Museum between 1865 and 1870. It was based on an undeterminable number of specimens. These specimens have not been traced in a recent type catalogue of the collection of the Zoological Survey of India (Chanda *et al.* 2000). Anderson (1871) made a detailed description but did not indicate a collector or donor for these specimens. Boulenger (1882: 34) listed the species as *Rana khasiana* in his catalogue and reduced the description to seven short lines. He did not refer to specimens present in the BMNH collections.

Boulenger (1882: 20) described *Rana laticeps* from a series of specimens collected by Jerdon in Khassya and on a "halfgrown" from Bengal collected by Beddome. The specimen from Bengal was mentioned as *Polypedates affinis*, a nomen nudum used on the jar label by Beddome (Bourret 1942). These specimens of Jerdon are still in the collection of the Natural History Museum of London and are likely to be part of those mentioned by Jerdon (1870) as "new *Pyxicephalus*".

In his work on the Asian frogs of the genus *Rana*, Boulenger (1920: 66) used the spelling *Pyxicephalus khasiensis* and credited it to Anderson (1871). But this spelling was not used by Anderson and did not qualify as a justified emendation, thus Boulenger (1920) just created a new incorrect subsequent spelling. Dubois (1987: 63) used this spelling in the combination *Limnonectes* (*Limnonectes*) *khasiensis* (Anderson, 1871) and Dutta (1997: 131) as *Limnonectes khasiensis* (Anderson, 1871). This subsequent spelling or aponym (Dubois 2000: 51) has no nomenclatural status and it does not qualify as a distinct available nomen, a qualification which applies only to *Pyxicephalus khasianus*.

Boulenger (1882) did not compare his new species *Rana laticeps* with *Pyxicephalus khasianus*. The description of *Rana laticeps* follows the paragraph about *Rana kuhlii* Tschudi, 1838, so we can consider that Boulenger considered these two species as close, whereas he mentioned *Rana khasiana* just after *Rana adspersa* (Tschudi, 1838) and *Rana maltzanii* Boulenger, 1882, both now considered members of *Pyxicephalus* Tschudi, 1838. Even though subsequent authors (Bourret 1942; Dubois 1987; Dutta 1997) considered both nomina to apply to species close to *Rana kuhlii* or *Limnonectes*, they did not go so far as considering these nomina to be synonyms. Another reason why the identity of *Pyxicephalus khasianus* was never assessed is the absence of identified type specimens. In fact these specimens had been in the hands of Sclater

(1892). Following the classification of Boulenger (1882), as he expressly stated, he identified them as *Rana laticeps* and considered in the same work the specimens of *Pyxicephalus khasianus* as absent in the collections of Kolkata. The morphological differences observed between the two series of type specimens, e.g., in head width, are mainly due to sexual dimorphism. Sexual dimorphism in head size is very conspicuous in *Limnonectes* and not taking them into account in taxonomic works may lead to misleading conclusions (Ohler & Dubois 1999).

NAME-BEARING TYPES

At the time of Anderson's description, the genus nomen *Pyxicephalus* Tschudi, 1838 (type-species *Pyxicephalus adspersus* Tschudi, 1838) was applied to the frogs now considered as members of the genus *Tompterna* Duméril & Bibron, 1841, *Laliostoma* Glaw, Vences & Böhme, 1998 and *Sphaerotheca* Günther, 1859. Theobald (1868) mentioned a single specimen of *Pyxicephalus* (*P. breviceps* (Schneider, 1799) from Ceylon) in the Kolkata collection. Jerdon (1870), two years before the publication of *Pyxicephalus khasianus*, mentioned the presence of a new *Pyxicephalus* in his collections from Khasi Hills. In his list of specimens of the Indian Museum, Sclater (1892) followed the classification of Boulenger (1882), the same that held about a century, and most ranoid frogs were allocated to the genus *Rana* Linnaeus, 1758. Thus he mentioned *Rana khasiana*, without mentioning specimens, but he listed two series of *Rana laticeps* from the Khasi Hills, three specimens (ZSI 9639-41) collected by Jerdon (1870: 84) and five frogs collected by J. H. Bourne in the 1880s (numerous specimens collected by him mentioned by Sclater in 1892 but not mentioned in earlier catalogues). Thus obviously the "*Pyxicephalus*" type specimens from the Khasi hills were absent in the Indian Museum collection in 1868, and in 1871 only the frogs of Jerdon would have been possibly accessed to the collection. Thus these specimens are good candidates as Onomatophores (name-bearing types) of *Pyxicephalus khasianus* Anderson, 1871.

Jerdon (1870: 84) stated that he collected a new *Pyxicephalus* from the Khasi Hills. The evidence given above indicates that these are the specimens described by Anderson (1871) as *Pyxicephalus khasianus* and by Boulenger (1882) as *Rana laticeps*. Anderson (1871) having referred a *Limnonectes* species to the genus *Pyxicephalus* as then understood is highly probable as Jerdon also used this genus nomen. Anderson (1871) also described several species of *Fejervaya* Bolkay, 1915 and *Sphaerotheca* Günther, 1859 as *Pyxicephalus* because of their terrestrial and fossorial habit and of the inner metatarsal tubercle rather well developed in these species as it is in species then allocated to *Pyxicephalus*. Anderson (1871) noted in his description of *Pyxicephalus khasianus* that the position of the vomerine ridge and the small size of the inner metatarsal tubercle would serve to separate the species in a new genus, meaning different from the Indian *Sphaerotheca* species allocated to this genus.

TO SUM UP

In conclusion there are two nomina available for the *Limnonectes kuhlii* group frog of Meghalaya. These two nomina, *Pyxicephalus khasianus* and *Rana laticeps*, are linked by an interesting synonymy. The type specimens collected by Jerdon (1870) belong to the same species and come from the same population but they are distinct specimens. The specimens BMNH 1872.4.17.295-9A to F are the syntypes of *Rana laticeps* Boulenger, 1882 and the specimens ZSI 9639-41 the syntypes of *Pyxicephalus khasianus* Anderson, 1871. Thus these nomina are subjective synonyms and the first available nomen, *Pyxicephalus khasianus* Anderson, 1871 is the valid nomen for this taxon as *Limnonectes khasianus* (Anderson, 1871). Here we designate the specimen BMNH 1872.4.17.295-9A, adult male, specimens figured by Boulenger (1882: table 1, fig. 1) as lectotype of *Rana laticeps* and the specimen ZSI 9640, adult female, as lectotype of *Pyxicephalus khasianus* Anderson, 1871. Below we give a formal synonymy list and the descriptions of the lectotypes.

SYSTEMATICS

Limnonectes (*Limnonectes*) *khasianus*
(Anderson, 1871)

Pyxicephalus – Jerdon 1870: 84 (not *Pyxicephalus* Tschudi, 1838).

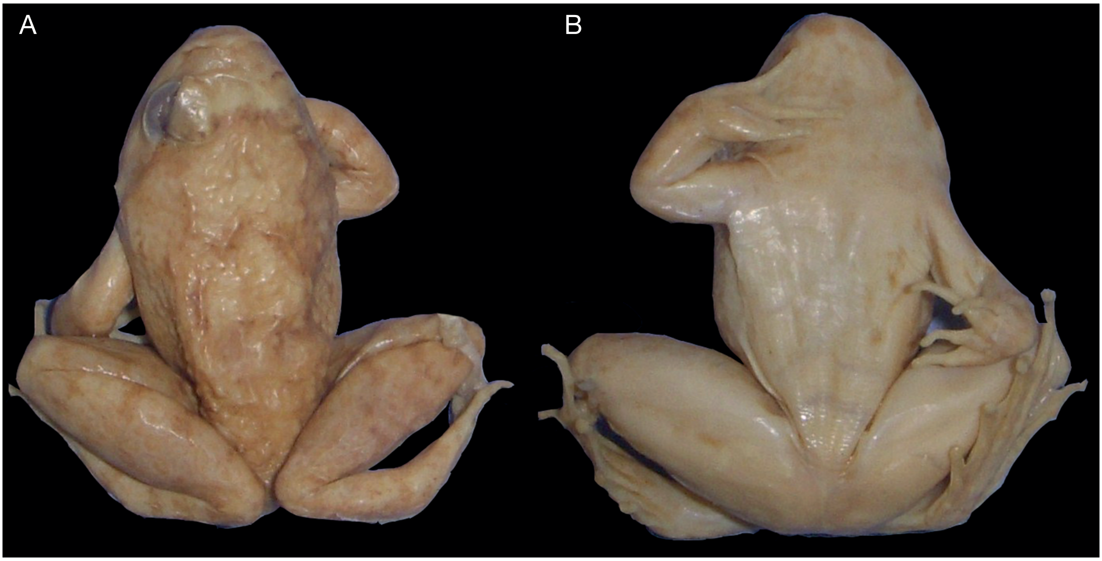

FIG. 1. — *Pyxicephalus khasianus* Anderson, 1871, ZSI 9640, lectotype, adult female, SVL 34.3 mm, in dorsal (**A**) and ventral (**B**) views (Photographs K. Deuti).

Pyxicephalus khasianus Anderson, 1871: 23. Onomatophore: lectotype by present designation ZSI 9640, adult female. Type-locality: Khasi Hills, Meghalaya, India.

Rana laticeps Boulenger, 1882: 20. Onomatophore: lectotype by present designation BMNH 1872.4.17.295-9A, adult male. Type-locality: Khasi Hills, Meghalaya, India; 1920: 67. — Sclater 1892: 3. — Taylor 1962: 405. — Inger 1966: 202. — Bourret 1942: 282. — Berry 1975: 72. — Dutta 1997: 131. — Manthey & Grossmann 1997: 96. — Chanda 2002: 116. — Choudhury et al. 2002: 278. — Chanard 2003: 116. — Das *et al.* 2007: 151. — Mathew & Sen 2010: 36.

Rana khasiana – Boulenger 1882: 34; 1920: 66. — Sclater 1892: vii. — Bourret 1942: 278 [synonym with doubt of *Rana kuhlii* Duméril & Bibron, 1841]. — Frost 1985: 498. — Chanda 1994: 75. — Dutta 1997: 131. — Chanda 2002: 116. — Mathew & Sen 2010: 36.

Pyxicephalus khasiensis – Boulenger 1920: 66. Subsequent incorrect spelling. — Bourret 1942: 278.

Limnonectes (*Limnonectes*) *khasiensis* – Dubois 1987: 63.

Limnonectes (*Limnonectes*) *laticeps* – Dubois 1987: 63.

Limnonectes khasiensis – Dutta 1997: 131.

Limnonectes khasianus – Chanda *et al.* 2000: 119.

DESCRIPTION OF THE LECTOTYPE OF *PYXICEPHALUS KHASIANUS* ANDERSON, 1871 (FIG. 1)

Lectotype by present designation, ZSI 9640, adult female, collected by Jerdon in "Khasya" on 08.04.1870. This specimen is in good condition.

Size and general aspect

Specimen of moderate size (SVL 34.3 mm), body robust.

Head

Head of very large size, shorter (HL 14.3 mm; MN 10.9 mm; MFE 9.6 mm; MBE 5.3 mm) than wide (HW 13.3 mm), convex. Snout rounded, scarcely protruding, its length (SL 5.76 mm) slightly longer than horizontal diameter of eye (EL 5.0 mm). Canthus rostralis rounded, loreal region concave, vertical to upper head. Interorbital space flat, its width (IUE 3.2 mm) about width of upper eyelid (UEW 3.5 mm) but little shorter than internarial distance (IN 4.0 mm); distance between front of eyes (IFE 6.9 mm) about two-third of distance between back of eyes (IBE 10.1 mm). Nostrils closer to tip of snout (NS 2.88 mm) than to eye (EN 3.7 mm).

Pupil diamond-shaped. Tympanum poorly distinct, rounded, its diameter (TYD 2.6 mm) larger than its distance from eye (TYE 1.5 mm). Pineal ocellus absent. Vomerine ridges present, bearing teeth, posterior to choanae, at an angle of 45° to body axis, less close to choanae than to each other, longer than distance between them. Tongue large, cordate, emerginate; median lingual process absent. Tooth-like bony projections on maxilla poorly developed.

Forelimbs
Arm short, strong (FLL 7.4 mm), about length of hand (HAL 9.2 mm), not enlarged. Fingers short, thin, but toe IV long, thin (TFL 5.0 mm). Relative length of fingers, shortest to longest: I < II < IV < III. Tips of fingers rounded, slightly enlarged. Fingers II and III with dermal fringes; webbing absent. Subarticular tubercles prominent, rounded, single, all present. Prepollex oval, prominent; two oval, distinct palmar tubercles; supernumerary tubercles absent.

Hindlimbs
Shank three times longer (TL 19.5 mm) than wide (TW 5.8 mm), slightly longer than thigh (FL 18.7 mm) and distance from base of internal metatarsal tubercle to tip of toe IV (FOL 17.0 mm). Toes long, thin; toe IV rather long (FTL 9.4 mm), about one third of distance from base of tarsus to tip of toe IV (TFOL 25.7 mm). Relative length of toes, shortest to longest: I < II < V < III < IV. Tips of toes rounded, enlarged, a fold indicating dorso-terminal groove. Webbing large: I 0 – 1 ¾ II 0 – 2 III 0 – 2 IV 2 – 0 V (WTF 4.3 mm; WFF 3.7 mm; WI 4.7 mm; WII 3.3 mm; MTTF 8.4 mm; MTFF 8.2 mm; TFTF 5.9 mm; FFTF 6.8 mm). Dermal fringe along toe V well developed, from tip of toe to base of metatarsal tubercle. Subarticular tubercles prominent, oval, simple, all present. Inner metatarsal tubercle long, prominent; its length (IMT 2.1 mm) half the length of toe I (ITL 4.5 mm). Tarsal ridge present, extending on 2/3 of tarsus. Outer metatarsal tubercle, supernumerary tubercles and tarsal tubercle absent.

Skin
Dorsal and lateral parts of head and body: snout and side of head smooth; between eyes smooth with few horny granules; back and upper part of flanks with short glandular ridges and horny granules, more dense posteriorly; lower part of flank smooth. Dorsolateral folds, lateral lines, “fejervaryan” line, cephalic ridges and co-ossified skin absent; supratympanic fold prominent from eye to shoulder. Dorsal parts of limbs: forelimbs smooth; thigh, leg and tarsus with glandular warts and horny granules. Ventral parts of head, body and limbs smooth. No macroglands.

Coloration in alcohol
Dorsal and lateral parts of head and body: light brown triangle on snout, darker line in eye level, dorsum and dorsal part of flanks light brown with brown outlines on folds; ventral part of flanks getting whitish near belly; loreal and tympanic region light brown; tympanum light brown covered in dorsal part by brown band; upper lip light brown with brown bands. Dorsal parts of limbs: light brown with brown bands; posterior part of thigh light brown finely mottled with brown. Ventral parts: throat brown with whitish marbling and its margin brown with whitish spots; chest whitish with few brown spots; belly and thigh whitish; webbing whitish.

Female sexual characters
Not observed.

DESCRIPTION OF THE LECTOTYPE OF *RANA LATICEPS* BOULENGER, 1882 (FIG. 2)

Lectotype by present designation, BMNH 1872.4.17.295-9A, adult male, collected by Jerdon in “Khasya”. Specimen in good condition.

Size and general aspect
Specimen of moderate size (SVL 46.2 mm), body robust.

Head
Head of very large size, shorter (HL 20.0 mm; MN 17.7 mm; MFE 13.5 mm; MBE 9.6 mm) than wide (HW 21.7 mm), convex. Snout rounded, scarcely protruding, its length (SL 7.3 mm) slightly longer than horizontal diameter of eye (EL 6.3 mm). Canthus rostralis rounded, loreal region concave, vertical to upper head. Interorbital space flat, larger

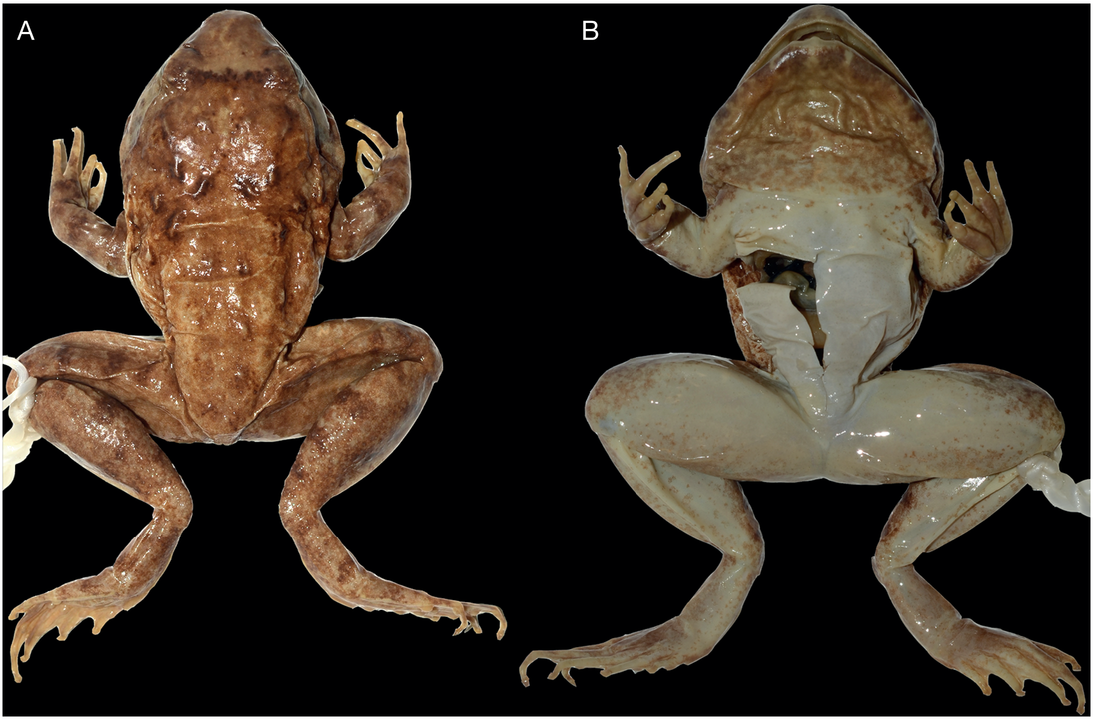

FIG. 2. — *Rana laticeps* Boulenger, 1882, BMNH 1872.4.17.295-9A, lectotype, adult male, SVL 46.2 mm, in dorsal (**A**) and ventral (**B**) views (Photographs A. Ohler).

(IUE 5.1 mm) than upper eyelid (UEW 3.7 mm) but little shorter than internarial distance (IN 5.6 mm); distance between front of eyes (IFE 9.3 mm) about three forth of distance between back of eyes (IBE 13.6 mm). (6) Nostrils closer to tip of snout (NS 2.6 mm) than to eye (EN 4.3 mm). Pupil diamond-shaped. Tympanum poorly distinct, rounded, its diameter (TYD 3.3 mm) about its distance from eye (TYE 3.5 mm). Pineal ocellus absent. Vomerine ridges present, bearing teeth, posterior to choanae, at an angle of 45° to body axis, less close to choanae than to each other, longer than distance between them. Tongue large, cordate, emerginate; median lingual process absent. Two pointed tooth-like bony projections on maxilla, very well developed.

Forelimbs

Arm short, strong (FLL 11.0 mm), about length of hand (HAL 11.4 mm), not enlarged. Fingers short, thin, but finger III long, thin (TFL 6.3 mm). Relative length of fingers, shortest to longest: I < II < IV < III. Tips of fingers rounded, slightly enlarged. Fingers II and III with dermal fringes; webbing absent. Subarticular tubercles prominent, rounded, single, all present. Prepollex oval, prominent; two oval, distinct palmar tubercles; supernumerary tubercles absent.

Hindlimbs

Shank two and half times longer (TL 23.8 mm) than wide (TW 9.6 mm), shorter than thigh (FL 24.5 mm) and than distance from base of internal metatarsal tubercle to tip of toe IV (FOL 26.9 mm). Toes long, thin; toe IV rather long (FTL 12.7 mm), more than one third of distance from base of tarsus to tip of toe IV (TFOL 33 mm). Relative length of toes, shortest to longest: I < II < V < III < IV. Tips of toes rounded, enlarged, a fold indicating dorso-terminal groove.

TABLE 1. — Measurement of type specimens of *Pyxicephalus khasianus* Anderson, 1871 and of *Rana lateralis* Boulenger, 1882 from Khasi Hills, Meghalaya, India collected by T. C. Jerdon in 1870. Abbreviations : see Material & methods.

	Pyxicephalus khasianus			***Rana lateralis***					
Coll. number	ZSI 9640	ZSI 9639	ZSI 9641	BMNH 1872.4.17. 295-9A	BMNH 1872.4.17. 295-9B	BMNH 1872.4.17. 295-9C	BMNH 1872.4.17. 295-9D	BMNH 1872.4.17. 295-9E	BMNH 1872.4.17. 295-9F
Sex	Female	Female		Male	Male		Male	Female	
Stage	Adult	Adult	Young	Adult	Adult	Young	Adult	Adult	Young
Status	Lectotype	Paralectotypes		Lectotype	Paralectotypes				
SVL	34.3	33.1	21.0	46.2	34.5	32.3	35.1	35.2	20.5
HW	14.3	14.5	8.8	21.7	15.4	14.1	14.7	15.5	9.4
HL	13.3	13.7	8.4	20	14.1	13.4	14.2	14.1	8.3
MN	10.9	11.8	6.9	17.7	12.7	11.6	12.7	11.4	
MFE	9.6	9.1	6.2	13.5	10.2	9.3	9.8	9.9	
MBE	5.3	5.6	4.2	9.6	6.2	5.3	6	5	
IFE	6.9	6.6	4.6	9.3	7.8	7.4	7	7.2	
IBE	10.1	9.7	6.3	13.6	9.6	9.6	10.2	11.1	
FLL	7.4	7.9	5.2	11	7.6	6.8	7.5	6.9	
HAL	9.2	8.7	5.5	11.4	9.4	7.9	10.4	9.0	
TFL	5.0	5.5	3.9	6.3	4.1	4	6.9	3.9	
TL	19.5	19.8	11.9	23.8	17	17.9	18.3	19.1	11.9
FOL	17.0	17.0	9.9	26.9	17.3	17.6	18.6	18.7	
FTL	9.4	9.6	6.3	12.7	9.7	8	10.2	11.7	
IN	4.0	4.1	3.0	5.6	3.1	3.6	3.3	3.6	
EN	3.7	4.0	2.2	4.3	3.4	2.7	3.5	3.2	
EL	5.0	5.2	3.1	6.3	4.2	4.8	4.6	5.3	
TYD	2.6	2.7	1.7	3.3	2.7	2.3	2.4	2.3	
TYE	1.5	2.5	1.2	3.5	2.1	1.5	1.6	1.6	
IUE	3.2	3.6	3.1	5.1	3.4	2.7	3	3.3	
UEW	3.5	3.2	2.2	3.7	2.7	3.1	3	3.5	
WTF	4.3	4.6	2.7	6.1	5.1	4.6	5.2	5.4	
WFF	3.7	3.7	1.6	5.2	3.9	2.9	3.2	4.5	
WI	4.7	4.4	2.8	5.8	5	4.1	4.8	5.1	
WII	3.3	2.7	2.4	3.8	3.6	2.5	3.3	4.1	
IMT	2.1	2.2	1.6	3.9	2.8	2.4	2.6	2.7	
ITL	4.5	4.6	1.8	5.4	4.6	4.2	4.6	4.5	
MTTF	8.4	8.7	6.8	13.9	10.5	9.8	10.4	11.2	
TFTF	5.9	5.7	3.4	13.1	9.5	9.1	9.6	11.2	
MTFF	8.2	8.2	5.3	6.2	5.3	5.4	5.6	5.5	
FFTF	6.8	7.1	4.0	8.5	6.9	6.7	6.4	7.5	

Webbing large: I 0 – 1 ¾ II 0 – 2 III 0 – 2 IV 2 – 0 V (WTF 6.1 mm; WFF 5.2 mm; WI 5.8 mm; WII 3.8 mm; MTTF 13.9 mm; MTFF 13.1 mm; TFTF 6.2 mm; FFTF 8.5 mm). Dermal fringe along toe V well developed, from tip of toe to base of metatarsal tubercle. Subarticular tubercles prominent, oval, simple, all present. Inner metatarsal tubercle long, prominent; its length (IMT 3.9 mm) 1.4 times in length of toe I (ITL 5.4 mm). Tarsal ridge present, extending on 2/3 of tarsus. Outer metatarsal tubercle, supernumerary tubercles and tarsal tubercle absent.

Skin

Dorsal and lateral parts of head and body: snout and side of head smooth; between eyes smooth with few horny granules; back and upper part of flanks with short glandular ridges and horny granules, more dense posteriorly; lower part of flank smooth. Dorsolateral folds, lateral lines, "fejervaryan" line, cephalic ridges and co-ossified skin absent; supratympanic fold prominent from eye to shoulder. Dorsal parts of limbs: forelimbs smooth; thigh, leg and tarsus with glandular warts and horny granules. Ventral parts of head, body and limbs smooth. No macroglands.

Coloration in alcohol

Dorsal and lateral parts of head and body: light greyish brown triangle on snout, dark line in eye level, dorsum and dorsal part of flanks ochre brown with dark brown outlines on folds; ventral part of flanks getting whitish near belly; loreal and tympanic region light brown; tympanum light brown covered in dorsal part by dark brown band; upper lip light brown with brown bands. Dorsal parts of limbs: light brown with brown bands; posterior part of thigh light brown finely mottled with brown. Ventral parts: throat brown with whitish marbling and its margin dark brown with whitish spots; chest whitish with few small brown dots; belly whitish; thigh whitish with brown fleckings on border; webbing light brown.

Male secondary sexual characters

Nuptial spines absent. Vocal sacs absent. Other male secondary sexual characters: enlargement of head and tooth-like projections on lower jaw.

Variation

The two other males are smaller in size (Table 1) but as they show well developed odontoid projections on lower jaw they are considered adult. Their head is also distinctly larger than long. The colour pattern is similar that of the lectotype.

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